

REMARKS

A new Declaration was required with an updated "duty to disclose" statement. Accordingly, attached hereto is a Supplemental Declaration that conforms with the examiner's requirement.

Claims 1, 2, and 5 have each been amended. The amendments to claim 1 respond to the §112 rejections of claim 1 and more particularly recite the several method steps that constitute the present invention. Additionally, they provide antecedent basis for the several recitations and they also provide completeness in that they connect cooperative relationships between the elements of the composition and the method steps by which the novel and unobvious heating element is produced, which were questioned by the examiner. As above amended, claim 1 is believed to be complete, clear, and in definite form. Accordingly, the dependent claims are also in conformity with §112 by virtue of their dependence from claim 1.

Claims 1, 4 through 6, 8, and 9 were rejected as obvious based upon a combination of the Schrewelius '145 and '959 references, together with the Sekhar et al. '399 reference. It should at first be noted that the primary Schrewelius '145 reference is directed to a thermocouple alloy, not to an electrical heating element. And further with respect to Schrewelius '145, the examiner has acknowledged that that reference does not disclose either the production of Al_2O_3 or that the ceramic binding substance that is present in the compositions disclosed in the Schrewelius '145 reference is at least 98% pure SiO_2 , as is claimed in claim 1.

It is important to note that the primary Schrewelius '145 reference teaches the use of bentonite as the ceramic binding substance for the composition for each of the legs of the thermocouple that is the subject of that reference (see Schrewelius '145, col. 3, line 3 for the teaching of bentonite as a component of the positive leg of the thermocouple and line 15 for the teaching of bentonite as a component negative leg of the thermocouple). Thus, in addition to the Schrewelius '145 reference failing to disclose molybdenum aluminum silicide mixed in combination with SiO_2 having at least 98% purity, as specifically recited in claim 1, it also teaches the use of bentonite, which claim 1 as hereinabove amended excludes from the composition produced by the claimed method, as well as from the claimed electrical heating element of claim 6. Thus, the Schrewelius '145 reference teaches away from the invention as it is claimed in each of claims 1 and 6, as well as in the other dependent claims.

With regard to the presence or absence of bentonite, the present application discloses in paragraph [0022] that bentonite includes a number of impurities and that those impurities negatively affect the function of a heating element that contains that material. The problem that is noted in the present application is the peeling or flaking away of the surface oxide in a heating element that is cyclically operated (see paragraph [0014]). Also as noted in the present application at paragraph [0011], bentonite contains SiO_2 in an amount of around 60-70% by weight. And that amount of SiO_2 in bentonite is corroborated by the attached printouts of several Internet web pages that identify the components and typical compositions of bentonite. Specifically, the

following Internet web pages show the indicated amounts of silica for bentonite:

<u>Web page</u>	<u>Silica content</u>
www.enfema.org	48-60%
www.botanical.com	61.4%
members.rediff.com	54.26%

Clearly, bentonite has considerably less than 98% SiO₂, and thus any teaching of a composition containing bentonite would not provide the benefits of the claimed invention.

The Schrewelius '145 reference thus does not disclose either the presence of SiO₂ of at least 98% purity, or the exclusion of bentonite as a component in the material as recited in amended claim 1.

The Schrewelius '959 reference was cited for disclosing a molybdenum silicide heating element in which Al₂O₃ is formed. However, there is no disclosure in that reference of an outer surface layer of Al₂O₃. Instead, the Al₂O₃ is disclosed merely as a constituent that reacts with SiO₂ to stop grain growth of the silicate, which would occur within the heating element at the grain boundaries. Although that reference mentions Al₂O₃, it does so only in the context of a constituent that reacts with SiO₂ to form a glass phase. Importantly, that reference does not disclose or even suggest an Al₂O₃ surface layer. Instead, it repeatedly refers to an outer surface layer of quartz glass (see, e.g., Schrewelius '959 at col. 1, lines 20-23; col. 2, lines 16-17, lines 41-50, and lines 67-71; col. 3, lines 1-2; col. 4, line 38; col. 5, lines 44-48; col. 8, lines 70-71; and col. 9, lines 2-3). The quartz glass outer layer serves to limit

high temperature oxidation (see Schrewelius '959 at col. 2, lines 48-50) and it stops grain growth (see Schrewelius '959, col. 6, lines 5-7) that results in brittleness of the material that limits further mechanical processing (see Schrewelius '959 at col. 1, lines 31-33).

Moreover, the composition disclosed at the bottom of column 5 of the Schrewelius '959 reference (col.5, lines 61-665) identifies as present in the therein-disclosed composition the types of impurities that are included in bentonite clay. That clearly suggests that bentonite clay is a constituent in the Schrewelius '959 composition, a constituent that the inventors have discovered leads to a peelable aluminum oxide outer layer. That aluminum oxide outer layer peeling problem is overcome in the present invention by providing in the heating element composition SiO_2 of at least 98% purity, which is not disclosed as a constituent in the Schrewelius '959 composition.

Finally, the Schrewelius '959 reference also does not indicate any recognition of the problem of a peeling Al_2O_3 outer layer when a heating element is subjected to thermal cycling, and therefore it does not teach or even remotely suggest a solution to that problem.

The Schrewelius '949 reference thus does not disclose either the presence of SiO_2 of at least 98% purity, or the exclusion of bentonite as a component in the material as recited in amended claim 1.

The Sekhar et al. '399 reference was cited for disclosing pure SiO_2 in the context of an electrical heating element. But that reference relates to different heating element compositions. In fact, the only mention at all in that reference

of the major constituent in the composition of the claimed invention, which is molybdenum disilicide (see Sekhar et al. at col. 1, line 27), is to point out that the use of that material in a powder metallurgy process requires sintering (see Sekhar et al. at col. 1, line 29), and that sintering is a costly operation (see Sekhar et al. at col. 1, lines 31-32). It then states that such a method, among other prior art methods, “exhibit serious disadvantages” (see Sekhar et al. at col. 1, lines 39-40), which clearly leads one away from the use of molybdenum silicide and away from a sintering process. It therefore teaches away from the invention as it is claimed in amended claim 1.

The Sekhar et al. reference also does not indicate any recognition of a peeling Al_2O_3 layer when a heating element is subjected to thermal cycling. In fact, there is no mention in that reference of an Al_2O_3 layer. Instead, that reference only mentions a protective layer of SiO_2 (see Sekhar et al. at col. 14, lines 29-30) or of TiB_2 (see Sekhar et al. at col. 14, lines 56-57). Additionally, the Sekhar et al. reference is directed to a different problem, that of providing oxidation resistance (see Sekhar et al. '399, col. 1, lines 39-44).

The Sekhar et al. '399 reference thus does not lead one to use molybdenum disilicide in a heating element material, it does not teach the step of sintering such a material with SiO_2 of at least 98% purity, it does not teach the formation on the surface of a molybdenum disilicide heating element of an Al_2O_3 surface layer, and it does not teach the exclusion of bentonite as a component in the heating element material in order to prevent surface peeling of an Al_2O_3 surface layer, all as recited in amended claim 1.

In addition to the differences in materials and in the differences in the problems to which the individual references are directed, there are no disclosures in any of the references relied upon that would motivate one having only ordinary skill in the art to combine them in any way at all, let alone to arrive at the claimed invention. Because the problem addressed by the present invention is not mentioned in the references and is different from the problems to which the references are addressed, one of only ordinary skill in the art would not be led to those references for a solution to the problem of the peeling of an Al_2O_3 outer surface layer of a heating element that is subjected to thermal cycling between room temperature and 1500°C .

Additionally, even if one of only ordinary skill in the art were to consider the references relied upon, is not apparent from the references just which parts of which reference should be combined with which parts of the other references and which parts of the references should be ignored or discarded. Indeed, it appears that the only motivation for even selecting the references, and then combining them in a particular way is the present disclosure. But it is improper to use as a road map or a template an inventor's disclosure in order to use against him that which only he has disclosed.

Claim 1 clearly recites an Al_2O_3 surface layer that does not peel under thermal cycling between room temperature and about 1500°C . None of the references relied upon discloses or suggests an Al_2O_3 surface layer, nor do any of the references even mention or appreciate the peeling problem to which the present invention is directed. In fact, the Sekhar et al. reference teaches away

from the invention as it is claimed in amended claim 1. Thus, whether the references are considered alone or together, neither the individual references nor any attempted combination of them teaches or suggests the invention as it is claimed in amended claim 1.

Claims 4 through 6, 8, and 9 each depend from one of amended claim 1 or amended claim 6, either directly or indirectly, and therefore the same distinctions as are noted above in connection with claims 1 and 6 apply with equal effect to those respective dependent claims. Further, the dependent claims contain additional recitations that further distinguish the invention as so claimed from the teachings of the references relied upon.

Claims 2 and 10 were rejected as obvious based upon the Schrewelius '145 and '959 references, together with the Sekhar et al. '399 reference, and in view of the Chyung et al. '091 reference. The Chyung et al. '091 reference was cited merely for a disclosure of mullite. However, the Chyung et al. '091 reference also lacks those features recited in amended claim 1 that are noted in the discussion above relative to the other references that were relied upon. Accordingly, the addition of that reference to the combination asserted in connection with claim 1 still does not teach or even suggest the invention as it is claimed in amended claim 1, from which each of claims 2 and 10 depend. Again, however, there are no disclosures in any of the references relied upon that would lead one having only ordinary skill in the art to combine them in any way at all, let alone to arrive at the claimed invention. And it is not apparent from the references just which parts of which reference should be combined

with which parts of the other references and which parts of the references should be ignored or discarded. Indeed, it appears that the only motivation for even selecting the references and then combining them in a particular way is the present disclosure. But it is improper to use as a road map or a template an inventor's disclosure in order to use against him that which only he has disclosed.

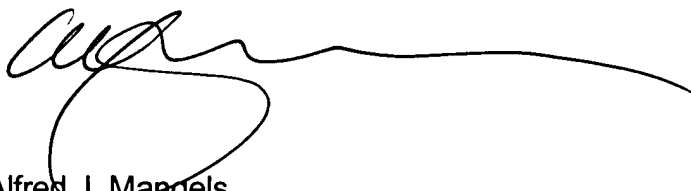
Claim 11 was rejected as obvious based upon the combination of the Schrewelius '145 and '959 references, together with the Sekhar et al. '399 and the Chyung et al. '091 references, in view of the Sawamura et al. '215 reference. The Sawamura et al. '215 reference was cited for disclosing sillimanite. But that reference also lacks the teaching or suggestion of the factors discussed above in connection with the other references and that are recited in amended claim 1. Therefore, even if the Sawamura et al. '215 reference were to be combined with the other references that are relied upon by the examiner, that combination still does not teach or suggest the invention as claimed in claim 1, from which claim 11 indirectly depends.

Based upon the foregoing amendments and remarks, the claims as they now stand in the application are believed clearly to be in allowable form in that they patentably distinguish over the disclosures contained in the references that were cited and relied upon by the examiner, whether those references be considered alone or together. Consequently, this application is believed now to be in condition for allowance, and reconsideration and reexamination of the application is respectfully requested with a view toward the issuance of a Notice of

Allowance.

The courtesy of an interview is requested if this amendment is not deemed to place the present application in condition for allowance. And in that event, the examiner is invited to telephone the undersigned to arrange a convenient time for such an interview.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Alfred J. Mangels', with a long horizontal flourish extending to the right.

June 30, 2008

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Saturday - June 28 - 2008

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Contact

Bentonite

- Mineralogical composition Calcium hydrated aluminosilicate.
- Production process
Natural calcium bentonite is converted to sodium type by soda addition (Na_2CO_3) and subsequently dried and ground to the required specifications
- Physical properties (typical)
Moisture content 10 - 13 %
Bulk density - powder 0.8 - 0.9 kg/dm^3
Finess (minus 200 mesh) 80 - 90 %
Water absorption capacity 700 - 900 %
pH 8.5 - 10.5
- Mineralogical analysis (typical)
Montmorillonite min. 80 %
CaCO₃ max. 20 %
- Chemical analysis (typical)
CEC meq / 100g 80 - 100
Na meq / 100g 75 - 95
Al₂O₃ 16 - 19 %
SiO₂ 48 - 60 %
Fe₂O₃ 4 - 7 %
CaO 6 - 10 %
MgO 2.5 - 4 %
- Handling / toxicity
Handling avoid dust formation
Toxicity inert material
- Specific advantages
Improves the quality of pellet (cohesiveness) reduction of pellet press power consumption and reduction of maintenance cost of pellet press. Reduction of acidosis risk
Reduction of moisture of faeces

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Bentonite Clay Profile

Origin- Wyoming/USA

Extraction- 100% naturally occurring and naturally quarry mined

Shelf life- Indefinite (4-5 years recommended)

Other Common Names- Sodium Bentonite, Sodium Montmorillonite, Wyoming Bentonite

Notes- The line of Bentonite clay offered by Mountain Rose Herbs is quarry mined from naturally occurring deposits and is untreated.

The variety being offered by Mountain Rose Herbs is a "Sodium Bentonite", and is NSF certified and manufactured to ANSI/NSF 60 standards.

Specifications

Color- Light gray to off-white

Odor- Flat

Mesh Size- US #200 Mesh

Mineral Content

Silica- 61.4%

Aluminum- 18.1%

Iron- 3.5%

Sodium- 2.3%

Magnesium- 1.7%

Calcium- 0.04%

Titanium- 0.02%

Potassium- 0.01%

Moisture- 7.8%

pH - 8.3 - 9.1

What is it?

Bentonite, also referred to as Montmorillonite, is one of the most effective and powerful healing clays used to treat both internal and external maladies. Bentonite can be used externally as a clay poultice, mud pack or in the bath and, in skin care recipes. Internally it can be added to water or glazed upon food to help those with sensitive palates. A good quality Bentonite should be a grey/cream color and anything bordering "pure white" is suspect. It has a very fine, velveteen feel and is odorless and non-staining. The type of bentonite offered by Mountain Rose herbs is a Sodium Bentonite.

How does it work?

Bentonite is very unusual in the fact that once it becomes hydrated, the electrical and molecular components of the clay rapidly change and produce an "electrical charge". Its highest power lies in the ability to absorb toxins, impurities, heavy metals and other internal contaminants. Bentonite clay's structure assists it in attracting and soaking up poisons on its exterior wall and then slowly draw them into the interior center of the clay where it is held in a sort of repository.

To state it another way...

"Bentonite is a swelling clay. When it becomes mixed with water it rapidly swells open like a highly porous sponge. From here the toxins are drawn into the sponge through electrical attraction and once there, they are bound.

Internal Use*

Typical, historical and general internal preparations are...



Alternative Health News

Large physical stature: Take one tablespoonful of Bentonite and add it to about eight ounces of liquid and thoroughly mix until the clay is completely combined with the water.
Medium physical stature: Take one heaping teaspoon of Bentonite and add it to about eight ounces of liquid and thoroughly mix until the clay is completely combined with the water.

Light physical stature: Take one level teaspoon of Bentonite and add it to about eight ounces of liquid and thoroughly mix until the clay is completely combined with the water.

External Use*

Typical, historical and general external preparations and general guidelines are.....
 Add 2-3 ounces of Bentonite clay to your bath and thoroughly mix in, soak and enjoy.
 For external packs add one part clay to three parts water or until you reach desired consistency, mix thoroughly to an even paste and apply to skin area

Where does it come from?

Bentonite clay is sedimentary clay composed of weathered and aged volcanic ash. The largest and most active deposits come from Wyoming and Montana. (Mountain Rose Herbs stocks a Wyoming variety).

How is it manufactured?

Bentonite is usually quarry mined from deposits that can range anywhere from 100 feet to several thousand feet. This depends on the health and vitality of the land it is processed from and how far a producer will go to find the right clay with the proper characteristics and consistency.

From here it is mined from the earth and brought out into the sun to remove excess water and moisture and, to make it easier to work with. After the initial drying begins the final transformation. It gets processed (ground) with huge hydraulic crushers and it then goes through the final process of micronization, or "fine granulating". This is usually done with the assistance of sophisticated and expensive granulators. Upon completion of this final process it gets inspected by a quality control team and is sent off for consumer use.

This information has not been evaluated by the Food and drug Administration. This information is not intended to diagnose, treat, cure, or prevent any disease.

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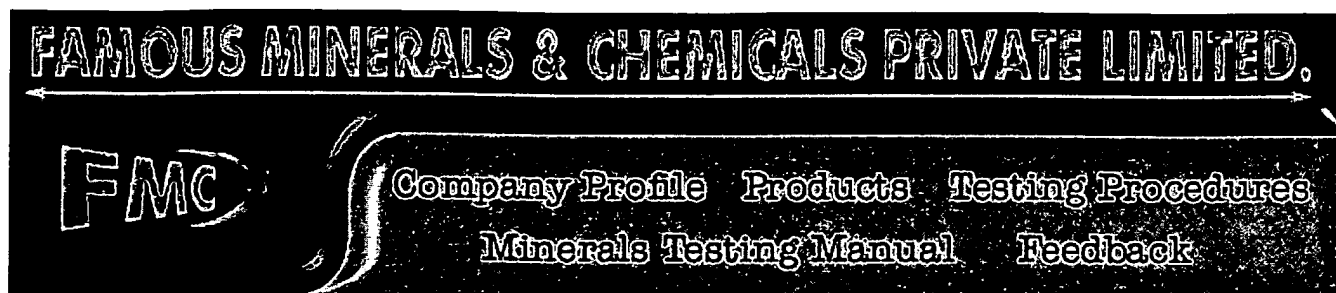
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BENTONITE

Bentonite is naturally occurring hydrated Aluminium Silicate. The most important use of Bentonite is based on its natural swelling property. One can surely say that bentonite is the most economic natural thickener available to industries.

It has the ability to absorb water several times its weight and give thickening fluid.
Chemically Bentonite is HYDRATED ALUMINIUM SILICATE.

Chemical Formula : $\text{Al}_2\text{O}_3 \cdot 4\text{SiO}_2 \cdot \text{H}_2\text{O}$

Physical Properties :

Sp. Gravity	: 2.4
Bulk density	: 0.6
PH of 10% Aqueous solution	: 8 to 8.8

Chemical Composition :

Silica	: 54.26
Aluminium	: 18.34
Ferric Oxide	: 10.91
TiO ₂	: 01.25

Industrial Application :

The greatest application of bentonite is in oil drilling. Great quantities of bentonite are used in drilling mud.

In paint industry it is used as a thickener in some cheap paints, primers, and water based coatings.

It is used in manufacture of cheap greases.

Normal Supplies : 240 mesh

Packing : HDPE bags 40 Kgs. nett.

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